REORDER ANALYSIS

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1.0 GENERAL

1.01 This section discusses the identification and analysis of customer and operator encountered reorders.

1.02 There are two major sources of reorder data available for the analysis and correction of this service affecting problem.

(1) Operator encountered reorders

(2) Standard and non-standard mechanized reorder traps in #4 and XBT switching offices.

1.03 While not all reorders are due to shortages of equipment and trunks, in many areas these shortages contribute far more to poor DDD service than do equipment failures and dialing errors.

1.04 Normally, Traffic data from TUR's and registers is relied upon to detect equipment and trunk shortages, however conditions can exist which can obscure load conditions. Analysis of Bureau data by Traffic and Plant members of the DDD Task Force can help to identify these conditions.

1.05 Continuing analysis of reorder data will substantiate Traffic studies and provide answers to such questions as —

(1) Do RO's coincide with known busy periods?

(2) Are all trunks and equipment in service during busy periods?

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(3) Do *local* dial results show a similiar RO condition to the same location? (Local calls to same NNX).

(4) Do the offices have a good load balance?

(5) Is 120 IPM tone improperly substituted for announcements or live intercept?

(6) Are certain items of equipment repeatedly contributing to a RO condition? (Senders, trunks etc.)

(7) Do equipment and trunk rearrangements or additions produce the expected improvement?

(8) While working on item (6) do work errors or equipment on make busy increase the RO incident?

1.06 To confirm the analyzers suspicions of shortages or equipment problems, it may be necessary to schedule special studies, or perform supplemental observing. In addition to operator reports and RO trap analysis, service observing results can also assist in RO analysis.

1.07 Call attempts which fail due to RO's are identified to the customer and operator as tones or announcements or live intercept. To aid in analysis, it is important that all tones and announcements furnished are standard as recommended in Traffic Engineering Practices and BSP-800-100-100 Section 4, and which are attachments #1 and #2 to this Section.

1.08 In addition to printouts of operator encountered RO's and RO trap results, the following data is also required for effective analysis.

(1) All summaries of failures on Service Observing.

(2) Traffic Engineering reports on overloaded circuit groups –

(A) Inter-toll groups

(B) Toll completing groups

(C) CAMA groups

(D) Extended area groups

(E) Operator office groups

(F) Intra-office groups

1.09 When required, maintaining stroke records, and the publication of NNXs and trunk groups experiencing high levels of RO's will focus attention on weak spots.

1.10 The Traffic member of the DDD Task Force is responsible for providing reorder information to the responsible Traffic administrative groups for their action. He is assisted in this task by the Plant member and the service observing analyzer, as well as the Long Lines or Toll representative. All problems in independent company territory are reviewed with the Independent Relations member of the Task Force.

1.11 The RO analyzer will be required to maintain close liaison with XBT and #4 machine administrators, 17C testboard forces, Plant central office maintenance people, and those people responsible for provision of network facilities.

2.0 OPERATOR ENCOUNTERED REORDERS

2.01 Operators when first encountering a RO or P announcement are instructed to mark the "RO" bubble on the mark sense billing ticket. See attachment #3. Operator instructions for reporting reorders are covered in Section 010-401-013.

2.02 The billing tickets are forwarded to the Data Processing Center for the billing process, after which lists are prepared from all tickets on which the RO bubble has been marked. These lists are forwarded to the Network Trouble Analysis Bureau weekly or as arranged for locally.

2.03 The printouts are provided in both originating and terminating order for analysis. The terminating listing includes the thousands and hundreds digit of the called number so connecter analysis in SXS areas and final frame analysis in panel areas can be performed. Section 010-401-012 Attachment #12 shows a typical terminating listing.

2.04 As shown on Attachments #1 and #2 customers and operators can receive two indications of call blockages or failures on their DDD attempts –

(1) Announcements

(2) 120 IPM tones

2.05 ***Announcements*** – Reorders identified by P or N type announcements originate from #4 or XBT switching machines. The "N" announcement is a no circuit (NC) or sender overload indication, while a "P" announcement is generally a common control equipment trouble or customer or operator dialing irregularity.

2.06 ***120 IPM Tones*** – Many types of reorders are recognized by 120 IPM tones. Both toll and local machines are capable of returning these tones.

2.07 Switchboards arranged for tandem access to SXS CAMA or #5XB toll machines will also receive 120 IPM tones which indicate machine blockages or NC conditions on inter-toll or toll completing groups.

2.08 In order to perform detailed RO analysis, the analyzer must be fully acquainted with the switching and trunking arrangements in the area, and the alternate routing capabilities of his machines.

2.09 P announcements and NC-RO blockages detected during service observing are also reviewed with all other RO data. Frequently the elapsed time shown on the observing ticket from the completion of pulsing to the receipt of the RO tone will indicate the progress of the call. Short interval RO's may originate at the observed machine.

2.10 Patterns prepared from analysis of service observations and operator mark sense tickets may be caused by –

(1) Cross connection assignment errors on trunks and equipment

(2) Inadequate equipment

(A) switches

(B) intra-office paths

(C) switching or trunks

(3) Poor office balance

(4) Defective equipment

(5) Equipment or trunk on "make busy"

(6) Provision of unproper tones

2.11 Reorder analysis should be a continuing function. Detailed analysis of ***reorder tones*** should be done as soon as results of service observing failures are received (daily), and when printouts of operator encountered RO's are available. (Operator encountered RO's can be reported as they occur if arranged for locally.)

3.0 REORDER TRAPS (MECHANIZED)

3.01 The primary objective of a mechanized RO trap program is the identification of the conditions causing #4 and XBT machine reorders, and their reduction to an acceptable level.

3.02 Plant and Traffic practices as well as Engineering letters thoroughly cover the analysis of the RO data, restated here are the procedures necessary to improve DDD service through the use of the trap.

3.03 The mechanized RO trap is an extension of the #4 and XBT trouble recorder leads via an appliqué circuit to produce an IBM card record of the details of sender routed reorder calls, vacant code calls, stuck sender conditions, and CAMA-ANI failures.

3.04 The cards are produced by a modified IBM card punch, to facilitate visual interpretation, and then sorted into the desired patterns on an IBM card sorter. The sorter can be shared with other operations such as the ADOIT test frame. (ATMS).

3.05 Sorting of the IBM cards identifies obvious trouble conditions on incoming or outgoing trunks, senders, and originating and terminating locations.

3.06 Where large volumes of cards are produced from single or multiple machine operation, the computer can generate outputs to assist in analysis. Arrangements are available to transmit data to remote computer locations directly.

3.07 Optical punched card readers can be located at the card source and programmed to read card columns as directed, and transmit the data via data-phone to a centrally located computer. While transmitting the data, a hard copy can be produced for rapid detection of obvious trouble situations.

3.08 Upon receipt of the data, the computer sorts and assembles it as previously directed, and returns the results for analysis. Retention of data for accumulation with failures occurring at a later time can also be arranged.

4.0 LOCATION OF CARD PUNCHES

4.01 The type of reorder trap will determine the location of the card punch or scanner.

4.02 Where a ***standard*** trap (Auxiliary Recording Control – AUXRC) is provided, the card punch and sorter are located in the #4 or XBT maintenance center. (See paragraph 5.05)

4.03 Where a ***non-standard*** trap is used, it is recommended that the card punch and sorter be located in the DDD Service Bureau if it meets physical and electrical requirements.

4.04 Locating the punch and sorter in the Bureau allows the trap to be used to its maximum. The Bureau must provide the necessary coverage.

4.05 Where a Bureau does not have physical or electrical arrangements, the card punch and sorter are located in the #4 or XBT maintenance center.

5.0 HOURS OF OPERATION

5.01 ***Standard traps*** are operated by the local maintenance people.

5.02 Standard traps are provided with peg count registers and event counters for vacant codes, CAMA-ANI failures and each of the types of reorders, and for monitoring retrials and E and M lead integrity failures.

5.03 When a failure rate exceeds a locally adjusted threshold value, audible and visual alarms indicate a need for action. This method of selective control minimizes the time and effort required to isolate switching performance troubles.

5.04 ***Non-standard traps*** are usually operated by the Network Analysis Bureau on a daily schedule. This will include morning, afternoon and evening machine busy hours. The traps should be operated for longer periods prior to busy season and preceding peak holidays such as Christmas and Mothers Day.

5.05 ***Caution*** must be exercised in operating ***non-standard traps*** under ***extreme*** load conditions since trap operation contributes to machine back-ups and affects traffic flow. Trap operations at these times is restricted to sampling.

6.0 TRAP ADMINISTRATION

6.01 The administration of all types of mechanized reorder traps is a joint responsibility of the machine administrative group, the traffic member on the DDD Task Force, and the machine maintenance people.

6.02 The coordination of the program will require the participation of the following groups –

(1) Network Trouble Analysis Bureau

(2) Traffic Machine Administrators

(3) Data Processing Center

(4) #4 or XBT Maintenance

(5) 17C Toll Testboard

6.03 The major division of responsibilities between the groups is –

(1) Network Trouble Analysis Bureau (See Attachment #4)

(A) Operate non-standard traps in accordance with paragraph 5.04 and establish a formal schedule.

(B) Sort cards hourly and daily to produce patterns which can be immediately referred for corrective action. This is extremely productive for identifying inter-toll facilities on an outgoing trunk basis.

Other sorts also present opportunities for corrective action in #4 and XBT maintenance, 17C operation (work errors), and operator keying performance.

(C) Arrange procedures for prompt referral of trouble patterns to 17C testboard and other maintenance or administrative groups.

(D) Maintain daily reorder trouble log.

(E) Forward all trap cards to the Data Processing Center daily for inclusion on the daily and weekly printouts as arranged for.

(F) Analyze and coordinate with other Bureau data all printouts provided by the DPC, and prepare pattern transmittals.

(G) Prepare trouble pattern referral (See Attachment #6 Section 010-401-011) and transmit via established procedures. Information on possible causes and recommended action should be included. Actual printouts can be attached to the transmittal.

Active policing of all patterns issued, and merging of trouble found and no trouble found replies with similar Bureau data from other sources is required.

Note: All patterns developed and referred to the field are treated in the field as directed by the Controlled Maintenance Plan (CMP).

(H) Prepare monthly summary of trap activity and results and include in DDD Bureau management report.

(2) *Traffic Administration*

(A) Up date trunk assignment data in the DPC master file. Forward changes at a frequency based on activity.

(B) Establish periodic audit of assignment data using Traffic records and master file printout.

(C) Work with the Network Trouble Analysis Bureau on vacant codes and the analysis of operator errors.

(3) *Data Processing Center*

(A) Provide and distribute printouts in accordance with established schedule.

(B) Update master trunk file as soon as possible after receipt of changes from Traffic.

(4) *Maintenance Forces* (#4 - XBT)

(A) Take prompt action on all special requests and trouble pattern referrals from the Bureau.

(B) When card punch and sorter are located in maintenance center, perform those operations required for trap operation as listed previously under Bureau responsibilities.

(C) In connection with (B), while responsibile for hourly and daily sorts, Bureau will continue to be responsible for the analysis of all daily and weekly printouts.

(5) *17C Toll Testboard*

(A) Provide qualified personnel to take prompt action on troubles referred by the Bureau or Maintenance forces.

(B) Assist as requested with special studies and identification of chronic troubles.

(C) Provide records of trunk lock-out stroking when requested by the Bureau.

7.0 ANALYSIS – RO TROUBLE TERMS (NON-STANDARD TRAP)

7.01 Following are the principle RO trouble conditions, and some possible causes and suggested corrective action –

(1) *Permanent Signals – PS*

Condition

An incoming seizure has been received on the trunk and the E lead to the machine is grounded. In the machine a sender has been connected and is waiting for digits, but none are received. After an interval the sender times out and routes the incoming trunk to reorder. The sender drops off. Operation of the reorder trap produces an IBM card coded PS. In a No. 4 system, when a 2-way trunk is connected to a reorder trunk equipment (if available) and, if the seizure persists for more than about 1-1/2 minutes, it will cause the trunk to be automatically locked out of service and the 17C testboard lockout lamp will flash.

Predominant Causes

(a) Carrier failures –

(b) MF tones too low to be recognized by MF receiver.

1. Trunk net loss out of limits

2. Echo Suppressor blocking MF.

3. Carrier fading.

(c) Hits of 20 seconds or more on carrier systems.

Clearance

(a) Remove trunk from service.

(b) Measure the trunk overall and correct to required limits.

(c) Distant office make test calls to home office code 103.

(2) ***Partial Digits – PD***

Condition

An incoming seizure has been received on the trunk and the E lead to the machine is grounded. In the machine a sender has been connected and some, but not the required number of, digits have been received. After an interval the sender drops off. Operation of the reorder trap produces an IBM card coded PD.

Predominant Causes

(a) On trunks employing dial pulsing, the signaling equipment failed after transmitting one or more digits.

(b) An echo suppressor, if trunk is so equipped, is clipping.

(c) There were hits on the trunk while out-pulsing.

Clearance

(a) Remove trunk from service.

(b) On DP trunks make overall pulsing tests in both directions and correct to required limits.

(c) Check trunk for noise and transmission level both directions.

(3) ***Operator Error – OE***

Condition

An incoming seizure has been received and the E lead to the machine has been grounded. A sender has been connected and some digits have been received; however, the ST pulse is received before the required number of digits is completed. The sender routes the call to reorder and drops off. Operation of the reorder trap produces an IBM card coded OE.

Predominant Causes

(a) Operator hits start key too soon.

(b) Interruption of pulses between first digit and start pulse. Possibly a trunk hit.

Clearance

Make test calls from distant end to home office code 103.

(4) ***Mutilated Digits — MD***

Condition

This condition occurs mostly on trunks employing MF signaling. An incoming seizure has been received and the E lead to the machine has been grounded. In the machine a sender has been connected and some or all of the required digits have been received; however, on one or more of the digits, more or less than the two required signaling tones have been received in the MF receiver. The sender routes the call to ROA and drops off. Operation of the reorder trap produces an IBM card coded MD.

Predominant Causes

(a) Poor operator keying on trunk not employing an originating sender. This should not normally produce a reorder pattern.

(b) Cross-talk or cross-modulation on the trunk.

(c) Foreign tones on the trunk.

(d) Defective trunk equipment.

Clearance

(a) Remove the trunk from service.

(b) Monitor for cross-talk, cross-modulation or noise.

(c) Have distant office make test calls to home office code 103.

(5) ***Unexpected Stop While Out-Pulsing — UX***

Condition

An incoming seizure has been received and a path established through the office from the incoming trunk to the outgoing trunk. The marker has seized the outgoing trunk and has connected the trunk signaling leads to the outgoing sender. The outgoing sender sees a ground on the E lead which is removed when the distant sender is ready to receive digits. The outgoing sender starts out-pulsing. Before the out-pulsing is completed, the outgoing sender again sees a momentary ground on the E lead. The outgoing sender is stopped, routes the incoming trunk to ROA and drops off. The reorder trap produces an IBM card coded UX.

Predominant Causes

(a) MF tones feeding back from distant two wire switching point.

(b) Relay bounce in SF units.

(c) Noise and cross-talk

Clearance

(a) Remove the trunk from service.

(b) Connect Sig. Test Set to E & M leads.

(c) Busy out all trunks lower in order of selection.

(d) Make test calls through the machine selecting the particular trunk.

(e) Observe the E lead for double hit or delayed operation.

(f) Sectionalize and clear any troubles noted.

(6) *Flash Ahead – FL*

Condition

An incoming seizure has been received and a path established through the office from incoming to the outgoing trunk. The marker has seized the outgoing trunk and connects the trunk signaling leads to the outgoing sender. The outgoing sender sees a ground on the outgoing trunk E lead and cannot out-pulse until the ground is removed. When this does not occur in 30 to 60 seconds the out-sender times out and flashes on the M lead. The sender routes the incoming trunk to ROA and drops off. Operation of the reorder trap produces an IBM card coded FL.

Predominant Causes

(a) Held "stuck sender" at the distant office.

(b) Simultaneous seizure from distant end.

(c) Delayed sender connect signal from distant end.

Clearance

(a) Remove the trunk from service.

(b) Request distant terminal to prime down the stuck sender.

(7) *Other Type – OT*

This is the same condition as previously described for unexpected stop – UX.

If the office senders are not equipped to indicate UX troubles, the reorder pattern will indicate OT. The cause and clearance are the same as the unexpected stops.

8.0 REORDER TERMS – (STANDARD TRAP)

8.01 Operation of auxiliary recording request keys at the maintenance center will produce IBM card records covering the four categories (reorders, vacant codes, stuck senders and CAMA-ANI failures) and as determined by features provided on the machine as follows–

WITHOUT SENDER RETRIAL

PS – Permanent Signal
PD – Partial Dial
PE – Pulsing Error
MD – Mutilated Digits
FL – Flash Ahead
UXS – Unexpected Stop
DPD – Dial Pulse Delay
CO – CAMA Other
ROM – Reorder Miscellaneous
VC – Vacant Code
SS – Stuck Sender
ANF – ANI Failure

WITH SENDER RETRIAL

PS – Permanent Signal
PD – Partial Dial
PE – Pulsing Error
MD – Mutilated Digit
CO – CAMA Other
ROM – Reorder Miscellaneous
IKF – Integrity Check Failure
NSDR – No Sender
DPD – Dial Pulse Delay
UXS – Unexpected Stop
MRE – Miscellaneous Retrial
VC – Vacant Code
FA – Final Attempt Failure
ANF – ANI Failure

8.02 Current Plant practices (BSP 212-321-301) and engineering letters which cover Standard Reorder Traps can be referred to for aid in detailed analysis and corrective action.

8.03 Due to the extreme importance associated with "Reorder Trap" analysis, it is suggested that all references to this subject be filed in Section 010-401-023 – Miscellaneous Reference Material, as they are issued.

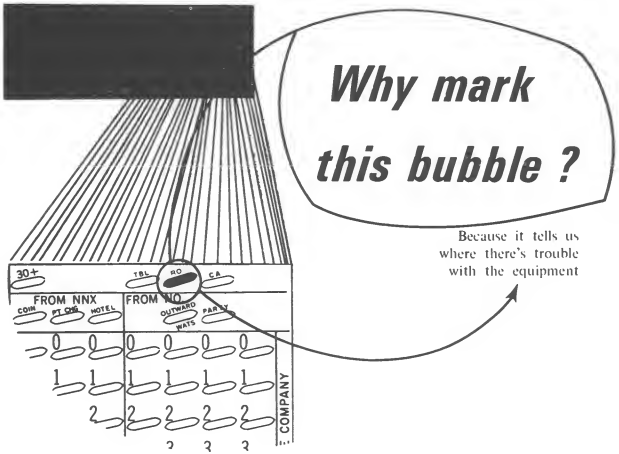
TONES AND ANNOUNCEMENTS RECOMMENDED FOR DISTANCE DIALING

The following table shows the recommended tones and announcements encountered by customers and operators on distance dialed calls. The texts of recommended or typical announcements are shown on attachment # 2.

CUSTOMER AND/OR OPERATOR ENCOUNTERS –	RECOMMENDED TONE OR ANNOUNCEMENT
Prior to start dialing	Dial Tone
On connection to called line or to operator trunk	Audible ringing signal
Line busy	60 IPM Tone
Switching blockages	
Local	120 IPM Tone (Announcement similar to "N" or "X" may be used)
Toll	
(a) #4 & toll XBT	
Switching Paths Busy	Announcement P
Sender Overload	Announcement N
(b) Other	
Switching Paths Busy	120 IPM Tone
Sender Overload	120 IPM Tone
All trunks busy	
Local & Toll Connecting	120 IPM Tone
Intertoll	
Normal	120 IPM Tone
Heavy Calling (#4 & toll XBT)	Announcement N
Disaster (#4 & toll XBT)	Announcement X
Common control equipment irregularity caused by misdialing or trouble	
Local	120 IPM Tone
Toll	
#4 & toll XBT	Announcement P
Other	120 IPM Tone
Vacant Number	Vacant Number Announcement or Operator
Vacant Code	Operator or Announcement L

RECOMMENDED ANNOUNCEMENTS

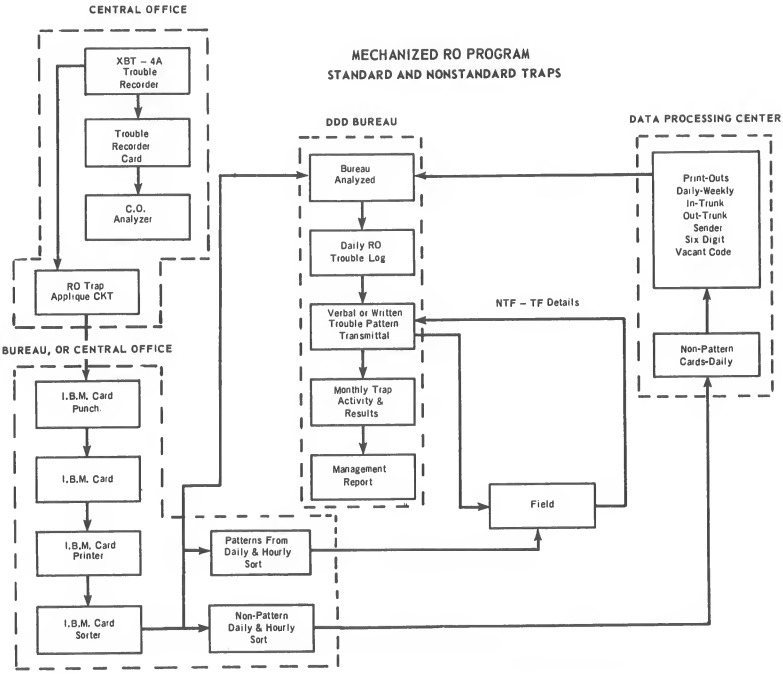
ANNOUNCEMENT	TEXT
N	I'm sorry, (pause) all circuits are busy now. Will you try your call again later, please? This is a recording.
P	I'm sorry, your call did not go through. Will you please hang up and try again? This is a recording.
L	I'm sorry, we are unable to complete your call as dialed. Please check the number and dial again or ask your operator for assistance. This is a recording.
X	(With flexibility due to situation) I'm sorry, unexpected damage to telephone equipment in Kansas City (or near Kansas City) has delayed your call. Emergency calls may be placed with your operator. This is a recording.
Vacant Number 1.) Announcement machine equipped with operator intercept cut-through.	I'm sorry. the number you have reached is not in service at this time. If you need assistance. please stay on the line and an operator will answer. This is a recording.
2.) Announcement machine not equipped with operator intercept cut-through (CDO's).	I'm sorry. the number you have reached is not in service at this time If you need assistance. please hang up and dial your operator. This is a recording



THE REORDER TONE MEANS THERE'S A BLOCKAGE . . . YOUR CALL CAN'T GO THROUGH. TELEPHONE PEOPLE AT THE DISTANT END DON'T KNOW THIS BLOCKAGE EXISTS UNLESS YOU, THE OPERATOR, MARK THE REORDER BUBBLE.

ALL TICKETS WITH MARKED REORDER BUBBLES ARE SORTED BY COMPUTER AND THE INFORMATION IS SENT TO THE NETWORK ANALYSIS BUREAU. INFORMATION YOU GAVE THEM BY MARKING THE REORDER BUBBLE TELLS THEM WHERE THE TROUBLE IS.

IF YOU MARK THE REORDER BUBBLE TODAY, CORRECTIONS CAN BE MADE AND YOU MAY NEVER GET THE REORDER TONE FROM THAT OFFICE AGAIN.



ISS 1, SECTION 010-401-018
Attachment #4